

The Pupa of *Chaoborus albatus* with a Key to Eastern *Chaoborus* Pupae^{1,2}

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INTRODUCTION

The pupa of *Chaoborus albatus* has never been described, although Cook (1956) presented descriptions and keys to the immature stages of most Nearctic *Chaoborus* species, including the larva of *C. albatus*. Particular emphasis is given below to determining those characters of the *C. albatus* pupa which distinguish it from the other *Chaoborus* species with which it is sympatric, especially its close consubgener, *C. punctipennis*. I have used the same anatomical features as Cook found most useful for *Chaoborus* pupae, and have constructed a key for the identification of the four eastern species recently cataloged by Cook (1965).

The following description is based on 9 male and 13 female pupae collected as mature larvae from Munro Lake, Cheboygan County, Michigan on 11 June 1966. At this time some pupae were present in the lake, and developing pupal structures could be seen in many of the larvae. The larvae were brought back to the laboratory and held in covered dishes of lake water. Within a few days all had pupated. Since *C. punctipennis* also occurs in Munro Lake (Roth, 1967), it was necessary to rear each pupa separately to positively associate pupae with larval exuviae. Pupae and exuviae were preserved in Kahle's fluid. A compound microscope fitted with an ocular grid was used in the preparation of Figs. 1-4.

Chaoborus (*Sayomyia*) *albatus* Johnson, Pupa

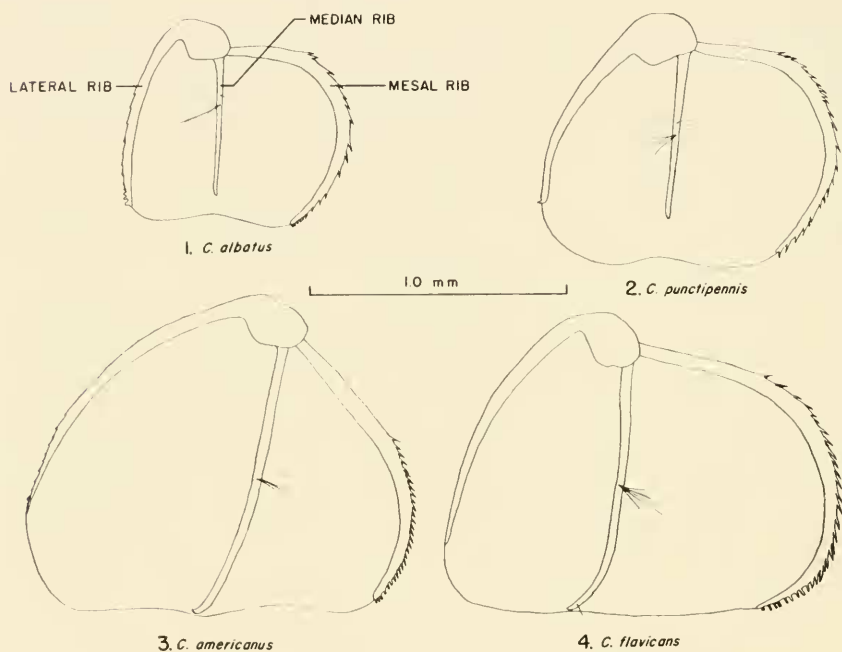
Total length (including anal paddles, not including respiratory horns) of males 5.4-6.2 mm (\bar{x} = 5.7 mm); of females 5.4-6.9 mm (\bar{x} = 6.1 mm). Abdomen of females slightly greater in relative length than males; Cephalothorax length one-third of total length of males; three-tenths that of females. Colorless, transparent, as in larva, becoming darkened as the adult develops within. Respiratory horns coarsely reticulated, 10-12 polygonal cells in width, 35-40 cells in length; horns 0.7-0.8 mm long, 0.2 mm wide. Abdominal tergite 7 with 3 pairs of plumose setae, as in *C. punctipennis*. Anal paddles (Fig. 1) with mesal rib coarsely toothed on the distal three-quarters; median rib weakly developed, incomplete, not reaching the distal margin of paddle membrane; median rib bearing a plumose seta and a minute, simple seta, about one-third the distance from the proximal end; lateral rib with 2-3 small teeth at the apex, and the remainder of the distal one-half of rib finely serrate.

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As might be expected, the *C. albatus* pupa closely resembles that of *C. punctipennis*. Apart from its slightly smaller size (which probably varies considerably between populations), the most promising character for separating the two species seems to be the armature on the distal half of the lateral rib of the anal paddle: this is finely serrate in *C. albatus*, and with-



FIGURES 1-4. *Chaoborus* spp., left anal paddle of pupa. FIG. 1. *C. albatus*, Munro Lake, 11 June 1966. FIG. 2. *C. punctipennis*, Douglas Lake, 6 July 1965. FIG. 3. *C. americanus*, Bryant's Bog, 10 July 1965. FIG. 4. *C. flavicans*, Frains Lake, 11 June 1965. Lake locations are given in Roth (1967).

out teeth or serrations in *C. punctipennis*, except at the apex, which is armed with a few small teeth in both species. The following key is based on the form of the anal paddles (which are intact in molted pupal skins), and will separate the pupae of the four eastern *Chaoborus* species.

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